

## Properties of Matter

### 5-4 The student will demonstrate an understanding of properties of matter. (Physical Science)

#### 5-4.6 Explain how temperature change, particle size, and stirring affect the rate of dissolving.

**Taxonomy level:** 2.7-B Understand Conceptual Knowledge

**Previous/Future knowledge:** In 3<sup>rd</sup> grade (3-4.2), students explained how water and other substances changed from one state to another by adding or removing heat. Students have not been introduced to the concepts of rate of dissolving of solutes in solutions in previous grades. They will further develop these concepts of rate of dissolving in high school Physical Science (PS-3.1).

**It is essential for students to** know that solutes (solids) dissolve in solvents (liquids) in solutions in different amounts in given times, which is called the *rate of dissolving*. The rate of dissolving can be affected by several factors.

#### *Temperature change*

- Usually, if the temperature increases, more of the solute will dissolve faster.

#### *Particle size*

- Usually, if the particle sizes are smaller, more of the solute will dissolve faster.

#### *Stirring*

- Usually, if the solution is stirred, more of the solute will dissolve faster.

**It is not essential for students to** know about solubility of solutes or whether a solution is saturated or unsaturated.

#### **Assessment Guidelines:**

The objective of this indicator is to *explain* how temperature change, particle size, and stirring affect the rate of dissolving; therefore, the primary focus of assessment should be to construct a cause-and-effect model about how these various factors affect the rate of dissolving. However, appropriate assessments should also require students to *recognize* factors that can increase the rate of dissolving and those that can decrease the rate of dissolving; *infer* how a given factor will affect the rate of dissolving; or *summarize* ways that the dissolving of a solute can be increased.